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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,541	04/27/2006	Christopher W. Cline	FIS920030079US1	2592

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INTERNATIONAL BUSINESS MACHINES CORPORATION
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EXAMINER

HOLLINGTON, JERMELE M

ART UNIT	PAPER NUMBER
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2829

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,541	Applicant(s) CLINE ET AL.	
	Examiner Jermele M. Hollington	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 6, 8 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by BOHLEN et al (3764898).

Regarding claims 1 and 24, BOHLEN et al. disclose apparatus and method for non-contact electrical test of electronic substrates comprising at least one electronic substrate (part of carrier 2) having top surface conductive features 3, 4 on a top side of electronic substrate 2 in electrical contact with bottom surface conductive features 1 on a bottom side of electronic substrate 2, an ionization source (electron beams)(column 3 lines 5-9) positioned above said top surface of electronic substrate 2 and connected to a first voltage source (inherent as voltage source is required for creating ionization potential), a fixture holding substrate (carrier 2), an array of probes (collectors) 13,14, a second voltage source connected to array of probes 13,14 (DC voltage applied between collectors 13,14)(column 3 lines 5,6), and current measuring electronics in contact with said array of probes (column 2 lines 23-26).

Regarding claims 6 and 8, BOHLEN et al. discloses shield (screen) 10 between ionization source and top conductive feature connected to third voltage source (column 2 line 66 to column 3 line 4).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 2-4 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over BOHLEN et al. (US 3,764,898 A) in view of Lagowski (US 6,538,462 B1).

Regarding claims 2-4, 25-27 BOHLEN et al. disclosed all of the claimed limitations as set forth above except ionization source comprising conductive wire or ribbon or wire mesh, which are well known in the art. Lagowski (US 6,538,462 B1) discloses wire type ionization source for gate dielectric integrity testing using corona discharge. At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify BOHLEN et al. by adding ionization source comprising conductive wire (ribbon or wire mesh are obvious variants) disclosed by Lagowski et al. for producing corona discharge for circuit integrity testing.

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6. Claims 5 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over BOHLEN et al. (US 3,764,898 A) in view of Wakalopulos (US 3,970,892 A).

Regarding claims 5 and 28 BOHLEN et al. disclosed all of the claimed limitations as set forth above except ionization source is coated with molybdenum. Wakalopulos (US 3,970,892 A) discloses ionization source (ion plasma electron gun) comprising electrode made of molybdenum, which is a conductive electrode material. At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify BOHLEN et al. by adding molybdenum coating to ionization source disclosed by Wakalopulos for increased conductivity.

7. Claims 7-17, 29-38 and 44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over BOHLEN et al. (US 3,764,898 A).

Regarding claims 7-17, and 29-38, BOHLEN et al. disclosed negatively biased shield 10 to facilitate the collection of secondary electrons by the collectors (probes). BOHLEN et al. did not explicitly disclose that the shield is cylindrical and segmented and that the first voltage is approximately 5,000 V and second voltage is approximately 2,500 V and fixture comprises conductive material having tapered geometry and connected to fourth voltage having a voltage between first and second voltage wherein fourth voltage is approximately ground, and fixture is comprised of conductive material. At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify BOHLEN et al. by adding segmented cylindrical shield so that they can be separately biased to modify the electric field distribution (field shaping) on conductive surface based on the first, second voltage, third and fourth voltages and by providing fixture comprised of conductive material for achieving a conductive ground connection.

Regarding claims 11, 12, 34, and 35 BOHLEN et al. did not explicitly disclose positive and negative ionization source but would have been obvious to do so for electrical testing electronic device in a wide voltage range. At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify BOHLEN et al. by adding positive and negative ionization source for electrical testing electronic device in a wider voltage range.

Regarding claim 44, BOHLEN et al. disclosed (Fig. 3) method for non-contact electrical short (continuity of conducting lines in multilayered structure)(interruption or short) test comprising one substrate having conductive features (wiring component) on top and bottom surface, securing electronic substrate in fixture (carrier), creating a region of ionized particle at an ionized source (electron beam) by applying a first voltage to ionized source, applying a second voltage to bottom surface (lower layer) 24 (column 5 lines 15,16) creating charge buildup and draining the charge through array of probes (collectors 25) connected to bottom surface, and measuring drain current (collector current) for detecting open (interruption) in conductive feature (wiring component) (column 5 lines 1-42). BOHLEN et al. did not expressly disclose applying a different bias voltage on each probe (collector) for detecting shorts. At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify BOHLEN et al. by adding different bias voltage on each probe (collector) based on the impedance of the circuit under test to determine conclusively the state (short or interruptions) of the conductor line.

Regarding claims 45 and 46, BOHLEN et al. did not expressly disclose the step of measuring voltage bias of each of the said array of probes without ionization source and electronic substrate but would have been obvious to do for calibration of apparatus. At the time

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the invention was made it would have been obvious for one of ordinary skill in the art to modify BOHLEN et al. by adding the steps of measuring the different bias voltage on each probe (collector) for calibration of apparatus.

8. Claims 18-23 and 39-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over BOHLEN et al. (US 3,764,898 A) in view of Nishioka et al. (US 6,043,665 A).

Regarding claims 18-23 and 39-43 BOHLEN et al. disclosed all of the claimed limitations as set forth above except electronic measurement circuit comprising logarithmic amplifier. Nishioka et al. (US 6,043,665 A) discloses electronics measurement circuit comprising logarithmic amplifier for measuring charging current. At the time the invention was made it would have been obvious for one of ordinary skill in the art to modify BOHLEN et al. by adding logarithmic amplifier disclosed by Nishioka et al. for measuring current in electronics measurement circuit.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jermele M. Hollington whose telephone number is (571) 272-1960. The examiner can normally be reached on M-F (9:00-4:00 EST) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jermele M. Hollington/
Primary Examiner
Art Unit 2829

/J. M. H./
March 12, 2008